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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,486	01/29/2001	Ronald J. Kelley	CM01465L	6842

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MOTOROLA, INC  
INTELLECTUAL PROPERTY SECTION  
LAW DEPT  
8000 WEST SUNRISE BLVD  
FT LAUDERDAL, FL 33322

EXAMINER

WILKINS TH HARRY D

ART UNIT PAPER NUMBER

1742

DATE MAILED 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.	Applicant(s)	
09/770,486	KELLEY ET AL.	
Examiner	Art Unit	
Harry D Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(a).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

### DETAILED ACTION

1. The objection to claims 11-13 has been withdrawn in view of Applicant's amendment.
2. The rejection grounds of the previous rejection have been changed to further clarify the motivation to combine the teachings of Appleby and Teitel. These new grounds of rejection were not necessitated by Applicant's amendment, thus, this action is non-final.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 8, 9 and 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teitel (US 4,211,537) in view of Appleby (US 5,813,222).

Teitel teaches (see fig. 3, abstract and col. 3, lines 25-31) a fuel cell hydride storage reservoir (92) for recharging a fuel cell. Hydrogen is moved into the reservoir (92) from a source. The fuel cell hydride storage reservoir (92) stores the hydrogen as metal hydrides. Teitel teaches storing the hydrogen in microcapsules (94) in tank (88).

Thus, Teitel does not teach that the hydrogen is produced by an apparatus including an electrolyzer, dryer and accumulator.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) an apparatus for producing hydrogen that includes an electrolyzer (50) for producing hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have attached the hydrogen production apparatus of Appleby to the recharging apparatus of Teitel because the hydrogen production apparatus of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the system of Teitel due to the method of storing hydrogen on-board as water and not in the microcapsules (94).

Regarding the process limitation that the stored hydrogen gas is "rapidly transferred from the accumulator to the hydride storage reservoir", this is a method limitation. The above limitation is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *in re Casey*, 152 USPQ 235, and MPEP 2114. However, Teitel teaches (see col. 10, lines 48-57) that the hydrogen is transferred by cooling the hydride storage reservoir, thus teaching the method of "rapidly transferr[ing] [hydrogen] from the accumulator to the hydride storage reservoir".

Regarding claim 2, Teitel teaches (see abstract and col. 10, lines 48-57) that the storage reservoir was provided with heat exchanging means to heat/cool the reservoir. During transfer of hydrogen into the reservoir, Teitel teaches that cooling the reservoir causes absorption of the hydrogen gas.

Regarding claim 3, Teitel teaches (see abstract and col. 10, lines 25-31) that the storage reservoir was provided with heat exchanging means to heat/cool the reservoir and that in order to use the previously absorbed hydrogen the metal hydride would have been heated (i.e.-prior to transfer of hydrogen). It would have been within the expected skill of a routineer in the art to have added a pump to evacuate the reservoir to ensure that all of the impurities in the reservoir had been removed.

Regarding claim 4, it would have been within the expected skill of a routineer in the art to have added a pump to evacuate the reservoir to ensure that all of the impurities in the reservoir had been removed.

Regarding claim 5, Teitel teaches (see abstract and col. 10, lines 25-31) that the storage reservoir was provided with heat exchanging means to heat/cool the reservoir and that in order to use the previously absorbed hydrogen the metal hydride would have been heated (i.e.-prior to transfer of hydrogen). During transfer of hydrogen into the reservoir, Teitel teaches (see col. 10, lines 48-57) that cooling the reservoir causes absorption of the hydrogen gas.

Regarding claim 6, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting

oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas. Appleby teaches that the vent is located on the water reservoir, not the electrolyzer. However, it would have been within the expected skill of a routineer in the art to have located the oxygen vent on the electrolyzer instead of the water reservoir. See MPEP 2144.04. VI. C. Shifting the position of the vent would not affect the operation of the system.

Regarding claim 8, it would have been within the expected skill of a routineer in the art to have added means for measuring the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 9, though Appleby is silent as to the actual size of the system, it would have been within the expected skill of a routineer in the art to have scaled the size of the system to any desired size, such as one cubic foot or less as claimed. See MPEP 2144.04. IV. A. The size of the system would not affect the operation of its components.

Regarding claim 14, Teitel in view of Appleby teach a system including a water supply connected to an electrolyzer to hydrolyze water into hydrogen and oxygen, a hydrogen accumulator and a fuel cell hydride storage reservoir to be refilled as claimed. Regarding the limitation that the stored hydrogen gas is "rapidly transferred from the accumulator to the hydride storage reservoir", this is a method limitation. The above

limitation is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *In re Casey*, 152 USPQ 235, and MPEP 2114.

Regarding claim 15, Teitel (see fig. 3, abstract and col. 3, lines 25-31) teaches a method of recharging hydrogen within a fuel cell comprising storing hydrogen gas in an accumulator and cooling a connected hydride storage container to cause the stored hydrogen gas to transfer from the accumulator to the hydride storage vessel.

Thus, Teitel fails to teach hydrolyzing liquid water to produce hydrogen gas, drying the hydrogen gas and storing the hydrogen gas thus produced.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) a method for producing hydrogen that includes an electrolyzer (50) for producing hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the hydrogen gas by the production method of Appleby for the recharging method of Teitel because the hydrogen production method of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the

method of Teitel due to storing hydrogen on-board as water and not in the microcapsules (94).

Regarding claim 16, Teitel teaches (see col. 10, lines 48-57) detecting the pressure drop in the hydride storage tank to find out when the hydrogen needs to be replenished. This step precedes the cooling step.

Regarding claim 17, Teitel teaches (see abstract) storing the hydrogen in a metal hydride.

Regarding claim 18, Teitel teaches (see abstract) that the storage reservoir was provided with heat exchanging means (104) to heat/cool the reservoir. Teitel teaches (see col. 10, lines 25-31) that heat is applied to the metal hydride to facilitate desorption. Thus, before refilling, Teitel teaches heating the metal hydride.

Regarding claim 19, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas.

Regarding claim 20, it would have been within the expected skill of a routineer in the art to have measured the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 21, Teitel teaches (see fig. 3, abstract and col. 3, lines 25-31) a method of recharging hydrogen for a fuel cell including storing hydrogen gas in an



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accumulator, heating a hydride storage reservoir for releasing anything absorbed by the hydride, connecting the hydride storage reservoir to the hydrogen accumulator, cooling the hydride storage reservoir to cause transfer of the hydrogen and storing the transferred hydrogen as a metal hydride.

Thus, Teitel fails to teach hydrolyzing liquid water to produce hydrogen gas, drying the hydrogen gas and storing the hydrogen gas thus produced.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) a method for producing hydrogen that includes an electrolyzer (50) for producing hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the hydrogen gas by the production method of Appleby for the recharging method of Teitel because the hydrogen production method of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the method of Teitel due to storing hydrogen on-board as water and not in the microcapsules (94).

5. Claims 7 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teitel (US 4,211,537) in view of Appleby (US 5,813,222) as applied to claims 1-6, 8 and 9 above, and further in view of Teitel (US 4,302,217).

As recited above, Teitel '537 in view of Appleby teach a system including a fuel cell metal hydride storage reservoir, a water supply connected to an electrolyzer for converting water to hydrogen and oxygen, hydrogen storage means including an accumulator, a dryer for drying the hydrogen, and a heat exchanger to heat and cool the reservoir.

Teitel '537 in view of Appleby do not teach a compressor attached to the accumulator.

Regarding claims 7 and 10, Teitel '217 teaches (see col. 12, lines 8-15) that by adding a compressor to increase the pressure of the hydrogen gas in a fuel cell metal hydride storage reservoir, the rate of absorption of hydrogen can be increased. Therefore, it would have been obvious to one of ordinary skill in the art to have added a compressor to the system of Teitel '537 in view of Appleby because the compressor would allow for an increased rate of hydrogen absorption. Regarding the limitation that the stored hydrogen gas is "rapidly transferred from the accumulator to the hydride storage reservoir", this is a method limitation. The above limitation is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *In re Casey*, 152 USPQ 235, and MPEP 2114.

Regarding claim 11, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting

oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas. Appleby teaches that the vent is located on the water reservoir, not the electrolyzer. However, it would have been within the expected skill of a routineer in the art to have located the oxygen vent on the electrolyzer instead of the water reservoir. See MPEP 2144.04. VI. C. Shifting the position of the vent would not affect the operation of the system.

Regarding claim 12, it would have been within the expected skill of a routineer in the art to have added means for measuring the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 13, it would have been within the expected skill of a routineer in the art to have added a vacuum pump to evacuate the reservoir to ensure that all of the impurities in the reservoir had been removed.

#### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection. The grounds of rejection have been changed to further clarify the motivation to combine the disclosures of Tietel '537 and Appleby. The teachings of Appleby include an easy means for producing clean and dry hydrogen gas in a continuous process using only water and electricity.

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**Conclusion**


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1700.

Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw

ROY KING   
SUPERVISOR  
TECHNICAL